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may perhaps best be accounted for by conceding to the group a normal dentition of $\frac{1}{3\ (3.3)\ 3}$ which by consolidation or suppression of teeth would cover all the forms yet investigated.

The species of Chitonidæ found in deep water on the American coast are enumerated, and the paper[1] concludes with a scheme of classification of the Docoglossa brought up to date from that proposed by the writer twelve years previously.

*(To be continued.)*

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# PROGRESS OF INVERTEBRATE PALÆONTOLOGY IN THE UNITED STATES FOR THE YEAR 1881.

BY C. A. WHITE.

WE have not to record the death of any worker in invertebrate palæontology during the past year, and the names of those who have published the results of their investigations during 1881, are mostly well known through their previous labors. The following account of work published during the past year is not really the measure of the amount that has been done; for some of those who are most deeply engaged in the work, have published very little within that time. Those gentlemen have kindly kept me informed of the progress of the work they have in hand, and mention is made of some of these in the following paragraphs:

Mr. S. W. Ford has continued his studies of the primordial fauna, and has published a very interesting paper on the "Embryonic forms of Trilobites from the Primordial rocks of Troy, N. Y., in the *American Journal of Science*, Vol. XXII, pp. 250–259, with 13 woodcuts. Also "Remarks on the genus Obolella," in Vol. XXI, of the same journal, pp. 131–134, with 5 woodcuts.

Professor James Hall informs me that "no reports of the New York State Museum having been printed for the past three years," he has a large amount of work awaiting publication. As these works may be expected to appear soon, only brief reference need be made to them now.

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[1] This paper did not appear until April, 1882, but on account of its relations to other material here treated of, the recorder has taken the liberty of calling attention to it. Those interested in deep-sea mollusks should also consult a paper in the *Journal de Conchyliologie*, by Dr Paul Fischer, entitled "Diagnoses d'espèces nouvelles de Mollusques recueillis dans le cours des expeditions scientifiques de l'aviso le Travailleur (1880–81)," l. c. pp. 49–53, Jan., 1882.

The museum report for 1880 is to contain some further work of Professor Hall's on the Bryozoans and Lamellibranchiates. The report for 1881 will contain the completion of the Lamellibranchiates and a continuation of the Bryozoans and corals, a discussion of Uphantænia and Dictyophyton, &c., &c. The report for 1882 will contain the completion of the work on Bryozoans and corals. The appendix to Vol. v, Part II, of the Palæontology of New York, with 16 plates, is near completion.

Professor Angelo Heilprin has continued his original investigations in connection with his professional duties at the Philadelphia Academy of Natural Sciences. The following is a list of the articles published by him during the past year, all of which have appeared in the Proceedings of the academy for 1881: "Notes on the Tertiary geology of the Southern United States," pp. 151–159; "A revision of the cis-Mississippi Tertiary Pectens of the United States;" "Remarks on the Molluscan genera Hippagus, Verticordia and Pecchiolia;" "Note on the approximate position of the Eocene deposits of Maryland," and "A revision of the Tertiary species of Arca of the Eastern and Southern United States." Professor Heilprin has other works in progress besides the arrangement and classification of the collection of the academy.

Professor Alpheus Hyatt has published the work mentioned in my last review, on the "Genesis of the Tertiary species of Planorbis at Steinheim," in the Anniversary Memoirs of the Boston Society of Natural History, 114 pages and 9 plates.

A synopsis of this work, together with other matter, was published in the Proceedings of the American Association for the Advancement of Science, Vol. XXIX, pp. 527–550, with two plates, under the title, "Transformations of Planorbis at Steinheim, with remarks on the effects of gravity upon the forms of shells and animals." During the summer of 1881 Professor Hyatt, together with a party of his assistants and students, visited Anticosti and other places in a yacht, for scientific study. Concerning his palæontological studies, he says: "I found specimens of Beatricia showing the terminal part to be an open cup. I also found natural sections exhibiting what seem to be vertical septa similar to those of Cystiophyllum." His memoir on the Ammonites is now ready for the press.

In June of last year Mr. U. P. James published a paper in No.

5 of *The Palæontologist*, pp. 33-44, which contains descriptions of a number of species of fossils by Mr. James, under the general title of "Contributions to Palæontology: Fossils of the Lower Silurian formation, Ohio, Indiana and Kentucky."

During the past year Mr. S. A. Miller has published the following articles in the Journal of the Cincinnati Society of Natural History: "Description of some new and remarkable Crinoids and other fossils from the Hudson River group, and notice of *Strotocrinus bloomfieldensis*," Vol. IV, pp. 69–77, illustrated on plate 1; "New species of fossils and remarks upon others from the Niagara group of Illinois," Vol. IV, pp. 166–176, illustrated on plate 4; "Descriptions of new species of fossils," Vol. IV, pp. 259–262, illustrated on plate 6; "Description of new species of fossils from the Hudson River group, and remarks upon others," Vol. IV, pp. 316–319, illustrated on plate 8. In the second of these articles Mr. Miller describes the new genus Zenocrinus, and in the last the new molluscan genus Pyanomya. He also continues his "Remarks on the Cenozoic age or Tertiary period," in No. 4 of Vol. III, and Nos. 1, 2 and 3 of Vol. IV of the same journal.

Mr. Samuel H. Scudder is still actively engaged upon work pertaining to fossil insects. Five installments of his "Bibliography of Fossil Insects" have appeared since the first two, mentioned in my last review. These seven parts comprise something over thirty pages. His memoir on the "Devonian Insects of New Brunswick has appeared in the Anniversary Memoirs of the Boston Society of Natural History, 41 pages quarto. His article on the "Structure and Affinities of Euphoberia," appeared in the *American Journal of Science*, Vol. XXI, pp. 182–186; and that on the "Tertiary Lake Basin at Florissant, Colorado," in the Bulletin of the United States Geological Survey of the Territories, Vol. VI, pp. 279–300, and also a map. The following have also appeared from his pen during the past year: "A notice of Goss' papers on fossil insects," in *Psyche*, Vol. III, p. 138; "On two new British Carboniferous insects, with remarks on those already known," *Geological Magazine*, Vol. VIII, pp. 293–300, with one figure; "Remarks on a remarkable Carboniferous Millipede," Proceedings of the Boston Society of Natural History, Vol. XXI, p. 122; "On *Lithosialis hohenica*," *ib.* p. 167; "Relation of Devonian insects to late and existing types," *American Journal of Science*, Vol. XXI, pp. 111–117.

Mr. Scudder has also nearly completed works on fossil spiders and the Archipolypoda.

Part II of the "Revision of the Palæocrinoidea," by Messrs. Charles Wachsmuth and Frank Springer has appeared in the Proceedings of the Academy of Natural Sciences of Philadelphia for 1871, pp. 1–237, and three plates. This important and exhaustive work embraces the family Sphæroidocrinidæ, with the subfamilies Platycrinidæ, Rhodocrinidæ and Actinocrinidæ. It is greatly to be desired that nothing will occur to prevent the consummation of the plan of these gentlemen to complete this work for the whole order.

Mr, C. D. Walcott has published his memoir, which was announced in my last review, on "The Trilobite; new and old evidence relating to its organization," in the Bulletin of the Museum of Comparative Zoölogy at Cambridge, Vol. VIII, pp. 191–224, with six plates. This paper contains, among other matter, a résumé of all the evidence concerning the character of the ventral appendages of Trilobites, with illustrations of those organs. He has also published a brief article in the *American Journal of Science*, Vol. XXII, pp. 394, 395; "On the nature of Cyathophycus," in which he expresses the opinion that the genus mentioned is a member of the same group to which Dictyophyton belongs, and which Professor Whitfield has shown to have close affinities with Euplectella, or the so-called glass-sponges. He is now engaged on some palæontological work for one of the divisions of the U. S. Geological Survey.

Professor A. G. Wetherby has published the following papers in the Journal of the Cincinnati Society of Natural History: "Description of Crinoids from the Upper Carboniferous of Pulaski county, Kentucky," Vol. III, pp. 324–330, illustrated on plate 9; "Description of new fossils from the Lower Silurian and Subcarboniferous rocks of Ohio and Kentucky," Vol. IV, pp. 77–85, illustrated on plate 2; "Description of new species of fossils from the Lower Silurian and Subcarboniferous rocks of Kentucky," Vol. IV, pp. 177–179, illustrated on plate 5.

In my review for 1880 I inadvertently omitted to mention Professor R. P. Whitfield's "Notice of new forms of fossil Crustaceans from the Upper Devonian rocks of Ohio, with descriptions of new genera and species," which appeared in the *American Journal of Science*, Vol. XIX, pp. 33–42. The new genera are

Echinocaris and Palæopalæmon. During the past year he has published the six following articles: "Observations on the structure of Dictyophyton, and its affinities with certain sponges," *American Journal of Science*, Vol. XXII, pp. 132. This is accompanied with a note by Dr. J. W. Dawson. "On the structure of a specimen of Uphantænia," pp. 132, 133; "A new genus [Anthracopupa] and species of air-breathing mollusk from the Coal-measures of Ohio, and observations on Dawsonella," *American Journal of Science*, Vol. XXI, pp. 125–128, with six wood-cuts; "Description of a new species of Crinoid from the Burlington limestone, at Burlington, Iowa," Bulletin No. 1 of the American Museum of Natural History, pp. 7–9, plates 1–2; "Remarks on Dictyophyton and descriptions of new species of allied forms from the Keokuk beds at Crawfordville, Indiana," Bulletin No. 1 American Museum of Natural History, pp. 10–20, plates 3 and 4. This article contains also a reprint of Dr. Dawson's observations on Uphantænia already mentioned. Professor Whitfield is the first to announce the opinion that these and kindred bodies are closely related to the so-called glass-sponges. "Observations on the purposes of the embryonic sheaths of Endoceras and their bearing on the origin of the siphon in the Orthoce'rata," Bulletin No. 1 American Museum of Natural History, pp. 20–28, and three wood-cuts. Besides his stated work at the American Museum, he is engaged upon the palæontology of New Jersey.

Professor Henry S. Williams has published in the Annals of the New York Academy of Natural Science, Vol. II, No. 6, his complete paper on the "Life-history of *Spirifer lævis*," of which an abstract was formerly published in the *American Journal of Science*.

Professor A. S. Packard, Jr., has published, in the Bulletin of Hayden's U. S. Geological Survey,[1] a description, with figures, of a new species of fossil crayfish, under the name of *Cambarus primævus*. The specimens were from the lower Tertiary fish beds of Bear river, Wyoming Terr.

In the *American Journal of Science*, Vol. XXII, pp. 134–136, Mr. W. W. Dodge has an article announcing the discovery of Lower Silurian fossils in Penobscot county, Northern Maine.

During the past year I have published the two following works: "On certain Cretaceous fossils from Arkansas and Colorado," Proceedings of the U. S. National Museum, Vol. IV, pp. 156–139, and one plate; "Fossils of the Indiana rocks," Annual report for 1880 of the Indiana Geological Survey, pp. 103–154, and eleven plates. I have also several other works now in the printer's hand.

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[1] See AMER. NAT., Vol. XV, p. 832.